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JIS B 0601 : 2001

(ISO 4287 : 1997)
(JSA)

Geometrical Product Specifications (GPS)— Surface texture : Profile method— Terms, definitions and surface texture parameters

15 S

8

B 0601 : 2001 (ISO 4287 : 1997)

4 Surface profile parameter definitions

4.1 Amplitude parameters (peak and valley)

4.1.1 maximum profile peak height Pp, Rp, Wp

largest profile peak height Zp within a sampling length (see Figure 6)

> Informative reference : The parameter is defined that Pp is "maximum profile peak height of primary profile", Rp is maximum profile peak height of roughness profile" and Wp is "maximum profile peak height of waviness profile" which result in the replacement with the names of profiles relating to "profile". Hereafter the same rule applies. However, for a part of parameter of roughness profile and waviness profile, the terms familiarized traditionally or easy to call are used.

4.1.2 maximum profile valley depth Pv, Rv, Wv

largest profile valley depth Zv within a sampling length (see Figure 7)

4.1.3 maximum height of profile Pz, Rz, Wz

sum of height of the largest profile peak height Zp and the largest profile valley depth Zv within a sampling length (see Figure 8)

> NOTE : In ISO 4287 : 1984, the Rz symbol was used to indicate the "ten point height of irregularities". In some countries there are surface roughness measuring instruments in use which measure the former Rz parameter. Therefore, care must be taken when using existing technical documents and drawings because differences between results obtained with different types of instruments are not always negligibly small.

> Informative reference : If the profile is the roughness profile, Rz is "roughness of maximum height" and if the surface profile is the waviness profile, Wz is "waviness of maximum height".
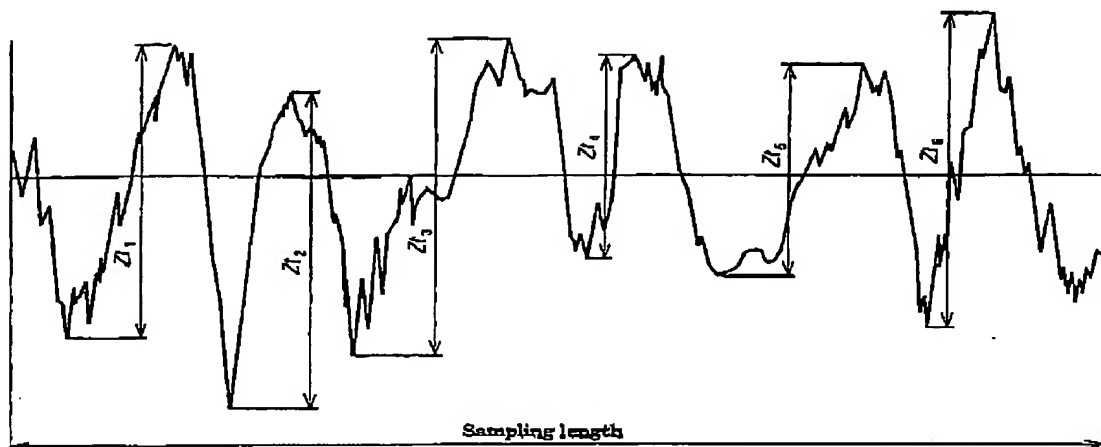
Figure 9   Height of profile elements
(example of a roughness profile)

4.2   Amplitude parameters (average of ordinates)

4.2.1   arithmetical mean deviation of the assessed profile Pa, Ra, Wa

arithmetic mean of the absolute ordinate values $Z(x)$ within a sampling length

$$Pa, \ Ra, \ Wa = \frac{1}{l} \int_0^l |Z(x)| \, dx$$

with $l = lp$, lr or lw according to the case.

Informative reference :   If the profile is the roughness profile, Ra is called "arithmetic mean roughness" which is traditionally familiar term and if the profile is the waviness profile Wa is called "arithmetic mean waviness".

4.2.2   root mean square deviation of the assessed profile Pq, Rq, Wq

root mean square value of the ordinate values $Z(x)$ within a sampling length

$$Pq, \ Rq, \ Wq = \sqrt{\frac{1}{l} \int_0^l Z^2(x) \, dx}$$

with $l = lp$, lr or lw according to the case.

Informative reference :   If the profile is the roughness profile, Rq is called "root mean square roughness" and if the profile is the waviness profile, Wa is called "root mean square waviness".

4.2.3   skewness of the assessed profile Psk, Rsk, Wsk

quotient of the mean cube value of the ordinate values $Z(x)$ and the cube of Pq, Rq or Wq respectively, within a sampling length

19

B 0601 : 2001 (ISO 4287 : 1997)

Annex C Table 2 Parameters of surface texture

Clause in JIS B 0601:2001	Parameters, JIS B 0601:2001	JIS B 0601:1994 and JIS B 0660:1998	JIS B 0601:2001	Determined within — evaluation length ln	Determined within — sampling length (²)
4.1.1	Maximum profile peak height	R_p	$Pp(^1)$		O
4.1.2	Maximum profile valley depth	R_m	$Pv(^1)$		O
4.1.3	Maximum height of the profile	R_y	$Pz(^1)$		O
4.1.4	Mean height of profile elements	R_c	$Pc(^1)$		O
4.1.5	Total height of profile	—	$Pt(^1)$	O	
4.2.1	Arithmetical mean deviation of the assessed profile	R_a	$Pa(^1)$		O
4.2.2	Root mean square deviation of the assessed profile	R_q	$Pq(^1)$		O
4.2.3	Skewness of the assessed profile	S_k	$Psk(^1)$		O
4.2.4	Kurtosis of the assessed profile	—	$Pku(^1)$		O
4.3.1	Mean width of the profile elements	S_m	$PSm(^1)$		O
4.4.1	Root mean square slope of the assessed profile	4_q	$Pdq(^1)$		O
4.5.1	Material ratio of the profile	t_p	$Pmr(c)(^1)$	O	
4.5.3	Profile section height difference	—	$Pdc(^1)$	O	
4.5.4	Relative material ratio	R_s	$Pmr(^1)$	O	
—	Ten point height (deleted as an ISO parameter)	R_z	$Rz/Jis(^3)$		O

Notes (²) This sampling length is lr, lw and lp for R-, W- and P-parameters respectively; lp is equal to ln.

(¹) Parameters which are defined for three profiles: primary profiles, waviness profile and roughness profiles. Only the roughness profile parameter is indicated in the table. As an example, the three parameters are written Pa (primary profile), Wa (waviness profile) and Ra (roughness profile).

(³) Ten-point height of roughness profile is the symbol for parameter used only in JIS, and does not apply to the primary profile and waviness profile.

Informative references 1 If the profile is the roughness profile, Rz is called "roughness of maximum height", Ra is "arithmetic mean roughness" and Rq is "root mean square roughness". In addition, if the profile is the waviness profile, Wz is called "waviness of maximum height", Wa is "arithmetic mean waviness" and Wq is "root mean square waviness".

2 In the original International Standard, t_p is defined as relative material ratio in the 1984 edition, but it was material ratio. The error is corrected in this Standard.

22
B 0601 : 2001 (ISO 4287 : 1997)

Annex 1 (informative)
Ten-point mean roughness

Ten-point mean roughness is the roughness parameter which is not included in the original International Standard (ISO 4287 : 1997) but is left in this Annex for information because it is widely popularized in Japan.

1   Ten-point height of roughness profile Rz_{JIS} In the roughness curve of the reference length obtained by applying a phase compensation zone passing filter of the cut-off values λc and λs, the sum of the mean of profile peaks from the highest to fifth height and the mean of profile depths from the deepest valley to fifth deepest valley.

Remarks :   If the maximum height roughness Rz based on this Standard is confused with Rz used for ten-point mean roughness which has been used in the past technical documents, the difference should be shown in note or the like.

2   Definitions of ten-point height of roughness profile given in the former standard   The ten-point mean roughness specified in the obsolete standards JIS B 0601 : 1982, JIS B 0601 : 1994 and JIS B 0660 : 1998 is widely used in Japan and accumulated in the technical documents in the past.

Remarks :   The ten-point mean roughness is the same in JIS B 0601 : 1994 and in JIS B 0660 : 1998.

a)   **Definition of ten-point mean roughness in the former standard JIS B 0601 : 1994**   In the roughness curve of the reference length (roughness curve in the former JIS B 0601 : 1994) obtained by applying a phase compensation high-pass filter of the cut-off value λc (phase compensation low-pass filter of the cut-off value λs is not applied), the sum of the mean of five profile peaks from the highest to fifth height and the mean of five profile depths from the deepest valley to fifth deepest valley.

If the difference between the ten-point mean roughness based on the former standard JIS B 0601 : 1994 and the above-mentioned Rz_{JIS} is anxious, the parameter symbol of Rz_{JIS} 94 is used for the ten-point mean roughness based on the former standard JIS B 0601 : 1994. When describing the contents of the symbol, the description in Annex 1 Table 1 is recommended to be seen.

Remarks :   The roughness curve defined in the former standards JIS B 0601 : 1994 and JIS B 0660 : 1998 does not exist at present.

b)   **Definition of ten-point mean roughness in the former standard JIS B 0601 : 1982**   The definition is given as the sum of the mean of five profile peaks from the highest to fifth height and the mean of five profile depths from the deepest valley to fifth depth in the primary profile of the reference length (the data measured as they are without any treatment such as filtering). The ten-point mean roughness based on this Standard is that which has been obtained using an analog type surface roughness tester. There may be a difference from Rz_{JIS} defined above as the ten-point mean roughness based on the former standard JIS B 0601 : 1982, so that, if it is necessary to distinguish these two symbols,